OFFICE OF JOINT COMPUTER SUPPORT

November 1973

Recommended Computer Systems Plan for 1974 Through 1976

Prepared by Ad Hoc Planning Group, PA 73-1

25X1A

[redacted] Chairman

Introduction

During the period from 6 August through 16 November the OJCS Computer Systems Planning Group, composed of seven representatives from all of the OJCS Divisions, met for the purpose of devising a three year plan for OJCS hardware and software systems. The group received direction and guidance from which a general statement of planning goals was developed. The group studied the current systems, the projection of computer loading for the planning period, and the capability of current and anticipated hardware and software. From this information the group derived the plan proposed here, along with a number of alternatives and options.

The intention of this paper is to provide a broad base for future detailed planning. The plan enhances our computer facilities in an orderly manner to meet projected loads, while remaining within our budgetary and manpower constraints.

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I. DESCRIPTION AND ANALYSIS

A. General Description

The plan calls for the retention of both 360/67 systems for most of the planning period, the stabilization of OS software, the replacement of the 360/195 with two 370/168's, the consolidation of ISG facilities, and eventually the consolidation and upgrading of the time sharing system.

B. Driving Forces

The group sees the following current situation in OJCS:

1. A generous batch capacity with limited backup capability.
2. Insufficient capacity to support projected GIM II requirements.
3. A saturated CP/CMS system with a rising workload.
4. A new customer (CRS) with a high on-line activity projection.
5. The scheduled delivery of ORACLE (the Mass Storage System) in the latter part of 1974, and early part of 1975.
6. The scheduled addition of the ISG computer center under the management of OJCS.
7. A projected increase in workload without substantial increase in people, dollars, and space.

Two principal driving forces were recognized at the onset of planning:

1. The requirement for improved CP/CMS interactive computing capabilities.

2. The OJCS commitment to GIMS II.

C. Interative Computing

The plan calls for the improvement of time sharing services through a three stage development: expansion of memory on the 360/67's, use of the second 67 as a CP/CMS system with shared disk access, and eventual implementation of VM on 370 hardware.

Strong consideration was given to the immediate implementation of VM/370; however, it was felt that the OJCS commitment to GIMS II precluded immediate major changes to the interactive system. Data from IBM and our own experience with the CP/67 interactive system indicate that memory is more important than processing power for increased capacity and performance. The additional facilities available under VM, namely the ability to emulate 370 systems, the virtual channel-to-channel support, and the enhanced dispatcher, did not merit the prompt adoption of VM. However, long range growth projections for the remote terminal system forecast the need for the installation of a fourth 370/168 system running VM/CMS by 1976.

The group recognized that software modifications including 3330 support code (already underway), and implementation of a shared disk facility are necessary for the extension of the useful life of the CP/67 system.

D. Batch Operating Systems

The plan calls for: utilization of OS Release 21.7 on both 360 and 370 hardware, and eventual adoption of VS2/JES3 in a multiprocessing configuration.

OS Release 21.7, the final OS release, will provide a stable environment for several years, and will permit the conversion to ASP Version 3.1, which is a requirement for ORACLE support. VS2 Release 2 appears, at this time, to have substantially improved facilities, notably security features, support for virtual memory, improved recovery management, and multiprocessing capability. However, the complexity of conversion and the current uncertainty of the system dictate an extensive planning and testing period prior to implementation.

E. Batch and OS On-line Hardware

The plan calls for replacement of the 360/195 with two 370/168's during the latter part of 1974 and early 1975.

Analysis showed the following benefits:

1. Increased memory capacity.
2. Less expensive memory.
3. Improved backup.
4. Physical space savings.
5. Longer predicted system life.

The more cost effective memory of the 168's (i.e., $6,000 per month per

megabyte memory versus $20,000 per month per megabyte memory for the 195) permits a dramatic increase in memory configuration. This allows for the integration of on-line applications and batch processing, providing both expanded resources for systems such as GIMS II and improved utilization of the hardware.

F. ISG Hardware Consolidation

The plan calls for the eventual consolidation of the ISG workload and the residual 65-2 workload into a single 370/168 system.

There are distinct advantages in satisfying the ISG computer processing requirements from a single complex of computer equipment instead of maintaining separate computer centers. Specifically, those advantages are flexibility, cost effectiveness, and increased backup capability without the need for separate backup facilities in each installation. The group recognized that a single 370/168 costs less than two 158's and is presumed to be ~~four~~ two times as powerful. ISG has had to plan backup capability (a second 158) sufficient to run their essential load, but that capability would not be fully utilized during the prime shift.

In addition to providing increased power to the overall OJCS configuration, the consolidation of hardware will make the resources of OJCS available to DD/O users.

G. Alternatives and Options

The complexity arising from the consolidation of the ISG workload leads to two alternatives which provide for the retention of ISG's

proposed 158's.

The first alternative:

1. Retain both 360/65 systems.

2. Retain both ISG 158 systems.

3. Cancel the installation of the third 370/168 system.

This alternative precludes the installation of VS software during the planning period.

The second alternative:

1. Retain the 360/65-2 system.

2. Retain both ISG 158 systems.

3. Replace the 65-1 system with a 370/158 system for implementation of VS software during the planning period.

4. Cancel the installation of the third 370/168 system.

The plan and the two alternatives discussed above assume a SAFE workload of 120 terminals. To provide for the option of supporting 500 SAFE terminals instead of 120, we would need to add to the recommended plan a fourth COMTEN (for terminating the additional 380 terminals) and a 158 computer. The three 168's in this plan would have some residual processing power for the added terminal load. However, under either of the alternative plans, the fourth COMTEN and two 158's would need to be added for SAFE.1/

1/ CRS has provided the planning group with a projection that a dedicated 158 processor would suffice for their SAFE requirements through 1975.

(See next page)

H. On-line Storage

The plan calls for no increase in disk storage capacity beyond the procurement currently underway and scheduled for completion by January 1974.

The group concluded that newly acquired disk storage should satisfy current and near future requirements, and that mass storage will eliminate the need for future capacity expansion.

I. Terminals

The plan addresses an expansion in terminal facilities by providing three COMTEN terminal controllers.

The requirement of multiprocessor terminal access, long recognized in OJCS, is available for virtually no additional cost via the COMTEN controller. In addition, the COMTEN's can terminate many more lines than can be addressed by any single processor.

In the course of our analysis, the group recognized a potential of over 1000 terminals (729 plan projected, 380 additional SAFE projected) by 1976. The plan has not addressed budgetary considerations for over 500 projected terminals. The group feels that the technical and financial implications of these terminals should be carefully scrutinized.

However, in light of past experience with similar applications, the group feels that a second 158 will be needed to satisfy the CRS projection for a total of 500 terminals through 1976.

II. LOAD PROJECTIONS AND ASSUMPTIONS

The following load projections were collected, evaluated and expanded by the planning group.

A. Batch Workload

The projected batch workload projections (Appendix B) combines CRS, ISG, and OJCS workload figures, and then applies the annual OJCS 22 percent growth rate to the total workload. This estimate is an upper bound projection based on previous uncontrolled growth of applications. No new batch languages beyond those currently supported are anticipated.

B. Interactive Workload

The projected interactive workload (Appendix C) is based on a review of growth and user projections and estimates made by planning group members. Therefore, the estimate is the planning group's "best-guess" and includes greater uncertainty than the projected batch workload for which valid historical data was available.

The following addresses the major areas considered by the planning group in deriving these projected figures:

1. Edit/Batch Users

The number of edit/batch users would continue to grow because of new CRS and ISG customers, as well as the new AD policy of users submitting their own jobs probably through the CP/CMS Batchmon procedures.

2. On-line Data Entry

The current quantity of on-line data entry is negligible; however, several projects include plans for using this facility. Further, it's assumed that AD's new policy of users submitting their own jobs would increase on-line data entry activity. However, the projected load figure is arbitrary.

3. Interactive Languages

The current use of Interactive Languages is minimal; however, OJCS policy encourages their use and, therefore, the planning group's workload estimate is expressed as a maximum attainable growth.

4. Text Processing

The text processing workload is based on (1) providing support for ISG/ATS users, and (2) nominal increase in the number of SCRIPT users.

5. SAFE

The SAFE workload projection is lower than that supplied by the customer, but as SAFE is experimental, the SAFE workload projection represents the planning group's estimate of the growth that could be reasonably attained during the planning period.

6. GIMS

The GIMS workload represent the planning group's maximum growth figures during the planning period, based on OJCS' GIMS II commitment.

7. Graphics

The Graphics load projection is minimal because of the small number of users who can be expected to require 2250-like support. However, the future graphics workload can be accommodated primarily with applications software for high-speed plotters and inexpensive graphic display terminals.

8. Program Development and Interactive Programs

These projections are based on the assumption that minimal growth is expected other than that from new CRS and ISG users.

9. Virtual Machines

This projection is based on the assumption that only system programmers use this function and, therfore, there will be only a minimum increase in this activity from new ISG users.

The group made the following assumptions:

A. GIMS II Load Projection

Recognizing the lack of information on the GIMS II problems and the committed priority of OJCS to this system, it is assumed that GIMS II workload will exceed the capacity of a 360/65 processor by January 1975.

B. Interactive Computing

Based on IBM estimates of 370/158 and 370/168 Virtual Machine (VM) system capabilities and OJCS' experience with the 360/67 CP/CMS system, it is assumed that OJCS' interactive computing capacity has been attained in its present configuration but that the projected use growth will not exceed the capacity of two 360/67 systems with additional memory through 1975.

C. System 360/195 Batch Processing

"Two halves are better than one whole." Considering the advantages of availability, backup, and operational flexibility, it is assumed that two 370/168s will be more cost effective than one 360/195 system.

D. System 370/168-1 System Utilization

It is assumed that GIMS II as a foreground job on a 370/168 would perform compatibly with background batch work and better utilize the facility than dedicated batch and dedicated on-line interactive systems.

E. GIMS II Monitor Consolidation

It is assumed that no major reason exists for separate GIMS II production application monitors executing in one computer installation.

F. On-line System Compatibility

It is assumed the GIMS II monitor will not perform adequately on a 360/65 processor with certain other on-line interactive systems.

G. DD/O Computer Center

In addition to management consolidation of the DD/O and OJCS computer centers, it is assumed that the hardware consolidation of both centers is a viable option. In that light, the coordination of all system development of the DD/O/ISG computer facilities must be attained to ensure operating system compatibility.

III. PLAN CHRONOLOGY

A. January 1974 - Upgrade the 360/67s

Increase the memory on the 67-1 to 2058K and the 67-2 to 2560K, add a drum controller and three drums to the 67-2. This will allow both 67s to run CP/CMS, will allow the 67-2 to back up any processor except the 195, and will provide adequate interactive computing capabilities through 1975 without incurring user inconveniences of new systems and their associated expenses.

B. January 1974 - ISG 158 (Blue) Installation

This CPU replaces the Blue 155.

C. March 1974 - OS Release 21.7

This should allow OJCS to stabilize on a fully supported Operating System and will facilitate hardware conversions during 1974 and 1975. IBM requires this release to support ASP Version 3 and should provide compatibility with other installations and support for the latest input/output devices.

D. April 1974 - ISG 158 (Red) Installation

This CPU replaces the Red 155.

E. June 1974 - ASP Version 3.1

This will provide many enhancements that are needed for stability, new hardware support and ORACLE. As with OS Release 21.7, ASP Version 3.1 is recommended since it is totally supported by IBM.

F. September 1974 - Install System 370/168-1

Assuming that the GIMS II workload will exceed the capacity of a 360/65 processor by January 1975, this will provide increased GIMS II

support. This also permits the release of the 360/65-1 in October 1974 (see Appendix A - 65-1 Application Configurations).

G. November 1974 - Install System 370/168-2

Once operationally stable with four megabytes of memory each, the two 168 processors will facilitate the release of the 195 in January 1975. Also, with IBM's planned multiprocessing capabilities, these 168s could be field upgraded to a MP-168.

H. November 1974 - CP Shared Disk-Access Facility

This will provide the capability to share the interactive load between the two 67s and is necessary to provide adequate capacity through 1975.

I. November 1974 - ORACLE Initial Installation

J. April 1975 - ORACLE Full Installation

To facilitate the installation of the ORACLE system, no hardware or software installations are planned from January 1975 through July 1975.

K. August 1975 - Install System 370/168-3

This CPU will facilitate the relocation of applications from ISG's 158 to OJCS. The ISG 158s and OJCS' will be released during September 1975.

L. September 1975 - Release ISG's Two 370/158s

M. March 1976 - Install System 370/168-4 and VM

This will permit the CP/67 Interactive System activities to be moved to the Virtual Machine (VM) system in April 1976 and permit the

release of the two 360/67 systems in May 1976. This will also provide flexible system backup options for the entire center.

N. September 1976 - Batch Virtual Systems and Multiprocessing

After installation of the 168-3, there will be capacity to satisfy batch, GIMS II, and online service requirements. Installation of Virtual System Release 2 (VS2) with Job-Entry Subsystem Version 3 (JES3) at this time should allow management of change as well as provide OJCS with new software and hardware facilities. These new facilities include (1) virtual system security features, (2) multiprocessing capabilities, and (3) improved distributive processing capabilities.

IV. BUDGETARY CONSIDERATIONS

Appendix D contains pertinent data for the proposed plan, the two alternatives, and the SAFE application option. The information is presented as follows:

A. Currently funded OJCS equipment

1. Processor and channels
2. Peripheral equipment
   - a. tape units
   - b. disk units (capacity - 9.6 billion bytes)
   - c. drums
   - d. terminal controllers
   - e. unit record equipment
     - (1) printers
     - (2) card reader/punch
     - (3) card reader
   - f. terminals
   - g. remote printers

B. The schedule of allocated ADP funds

1. ADP rentals
2. ADP purchases

C. The proposed Plan's projected budget

D. The proposed plan's projected budget including the SAFE application option.

E. Alternative 1's projected budget

F. Alternative 1's projected budget including the SAFE application option

G. Alternative 2's projected budget

H. Alternative 2's projected budget including the SAFE application option.

V. RECOMMENDATIONS

A. Immediate Items

1. Reconfigure the systems applications, as shown in Appendix A, to:

   a. provide an isolated environment for GIMS II production applications,

   b. improve the use of the expanded memory of the 65-2,

   c. increase the interactive computing capabilities,

   d. increase the backup capabilities of the 67-2 with expanded memory.

2. Generate a small operating system for the 65-1, GIMS II production applications to improve memory utilization.

3. Update system software to OS Release 21.7 and ASP Version 3.1 during the first and second quarters of 1974 respectively, to insure that hardware and software installations do not over simultaneously. This milestone is essential to the viability of the plan, and additional manpower and facilities should be devoted to meeting the schedule.

4. Determine the logistic requirements, (i.e., electrical power, chilled water, and space) to support the plan. This study should explore the possibilities of using a first floor area for the Computer Center's Control Point, Computer Processing Branch offices, peripheral processing and distribution area, and the tape section.

5. Determine the funds that could be obtained for the release of the 65-1 and purchase of the 67-2.

B. General Recommendations

1. Develop a shared disk-access facility for multiple CP/67 systems.

2. Convert all GIMS I applications by January 1974.

3. Consolidate GIMS II production applications under one monitor as soon as possible.

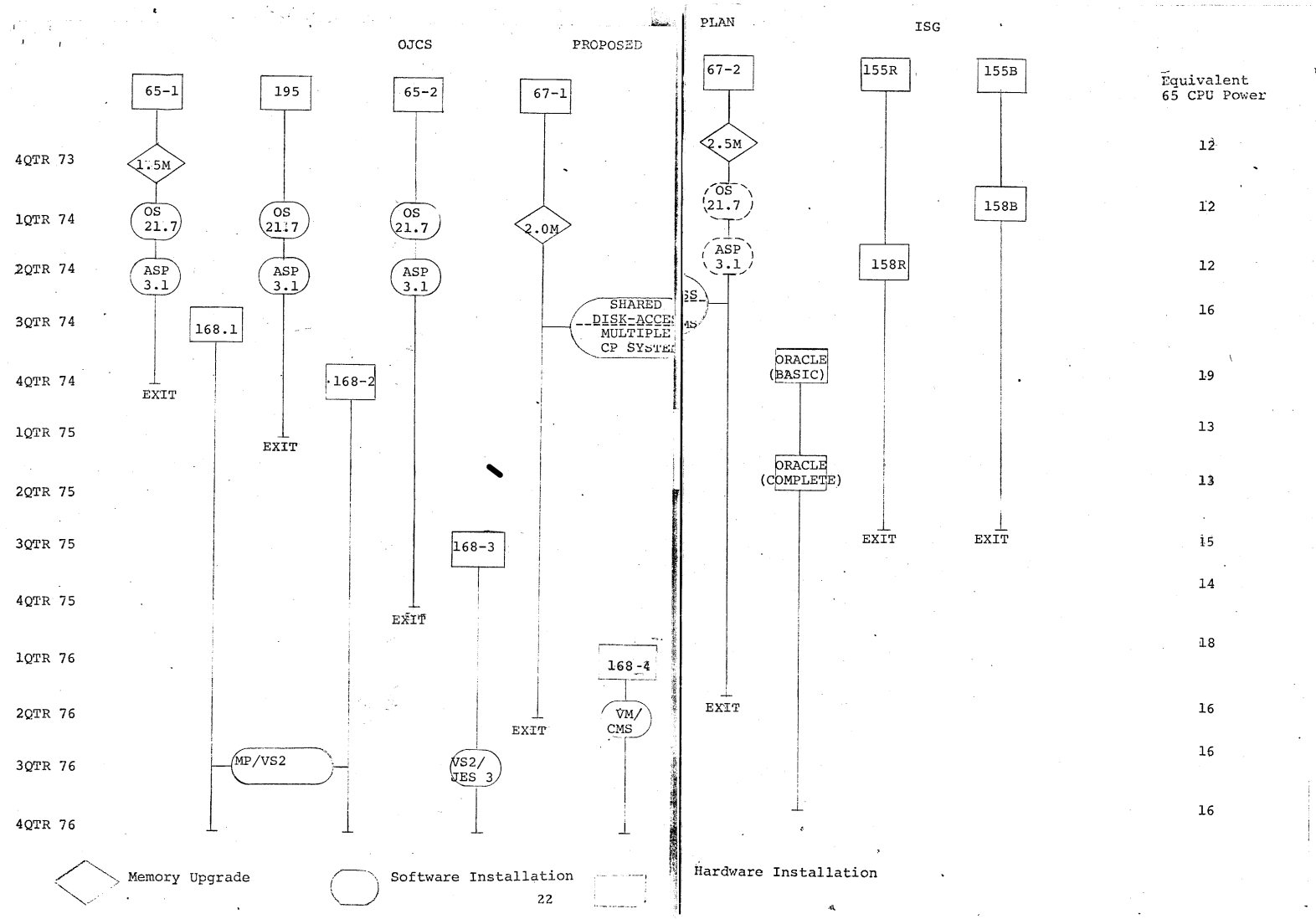
4. Provide FORTRAN and/or APL interactive programming packages to support additional personal interactive language requirements in lieu of a new interactive language such as BASIC.

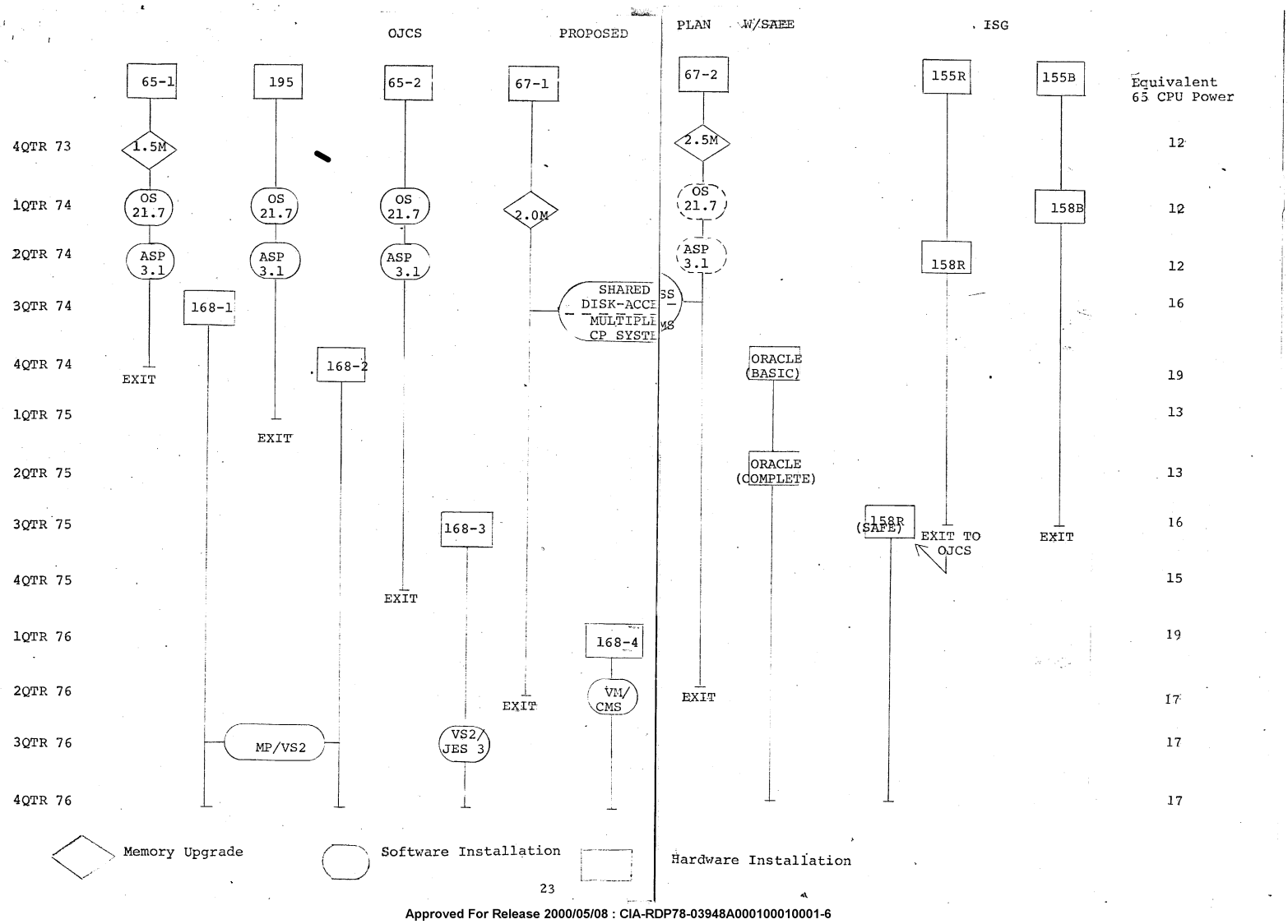
5. Transfer the support of all DDO/ISG non-STAR applications to the OJCS Computer Center.

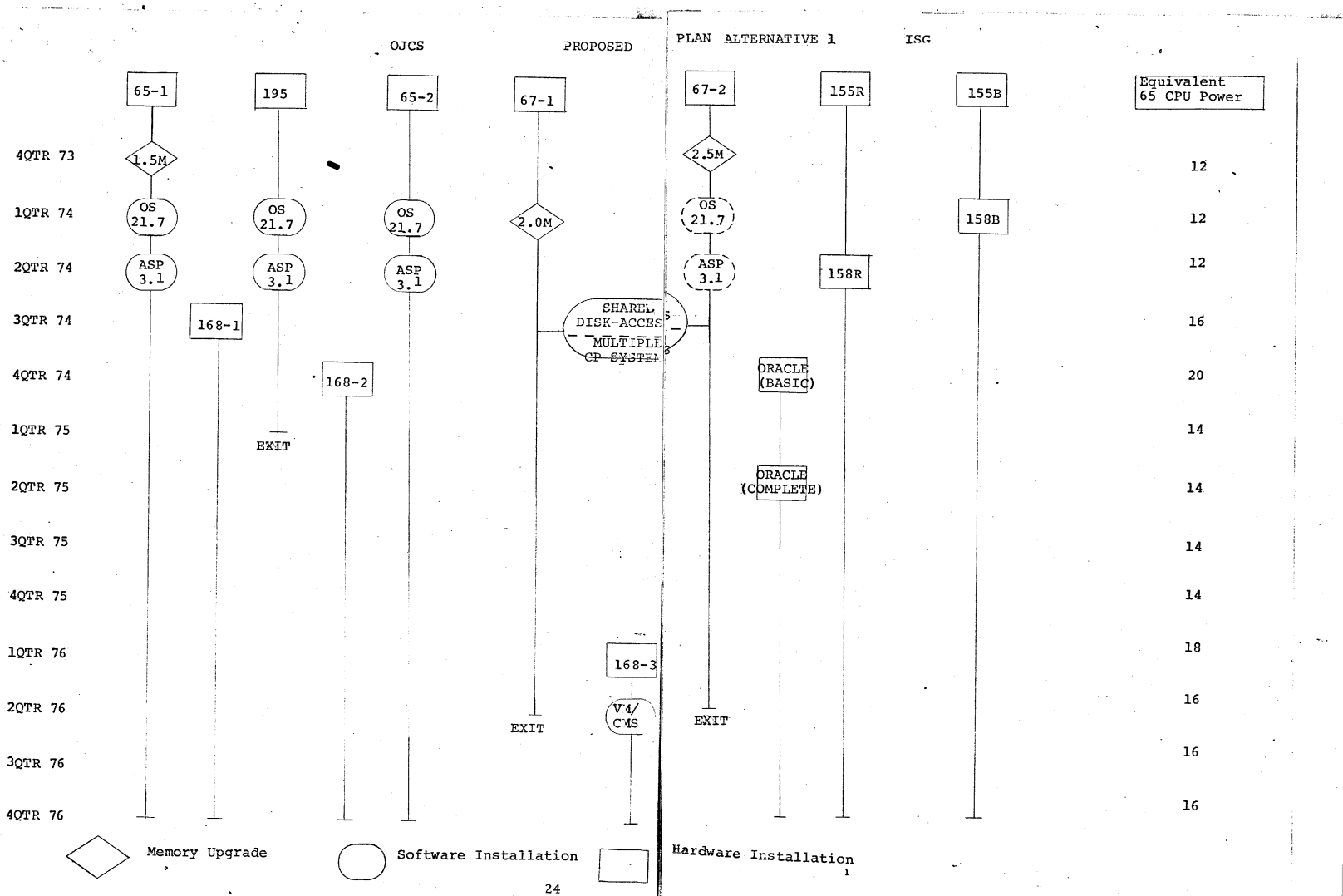
6. Coordinate the development of all on-line systems, such as SAFE, through the OJCS Systems Engineering Division (SED).

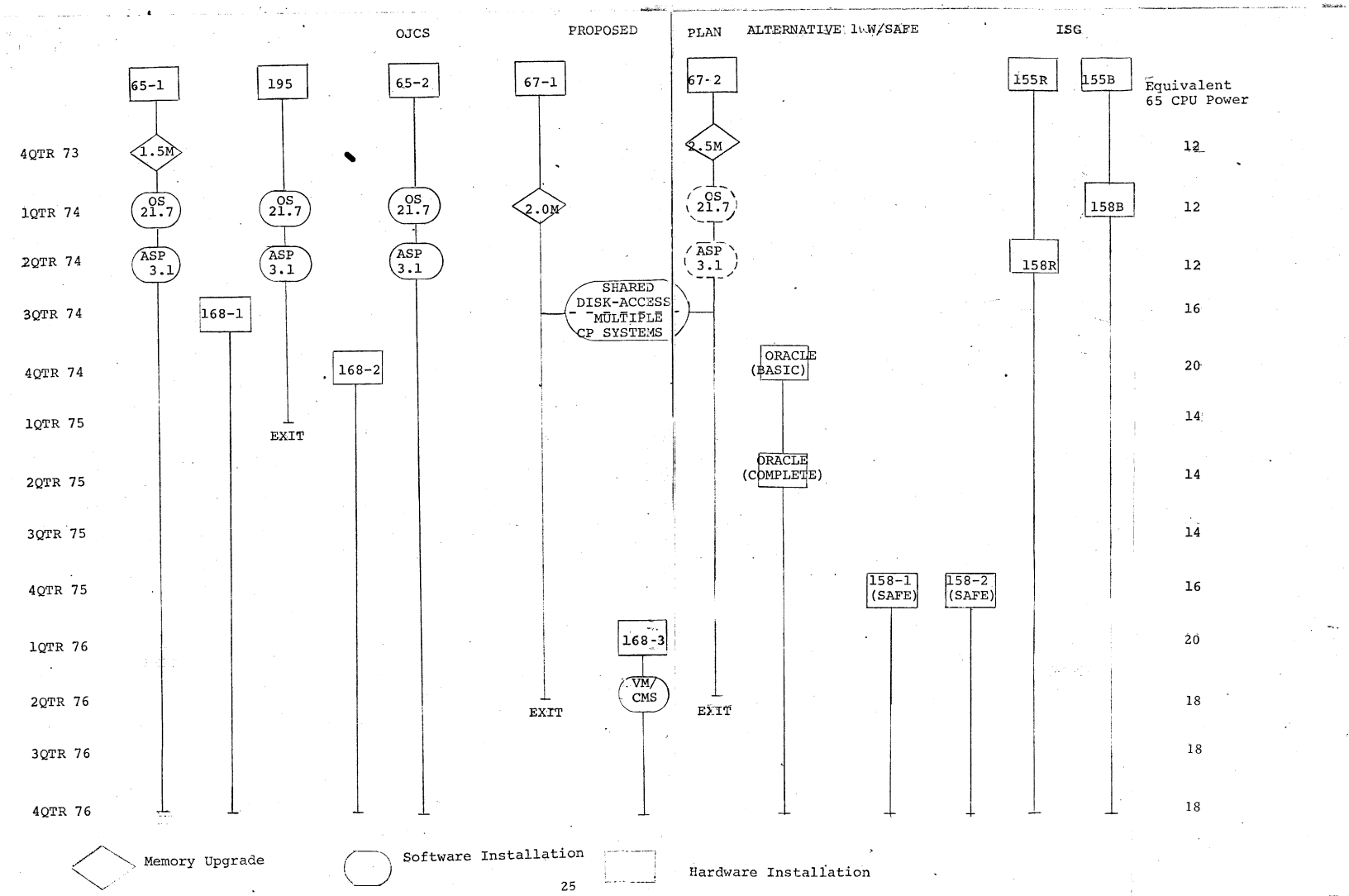
7. Expand the COMTEN facilities to meet terminal requirements.

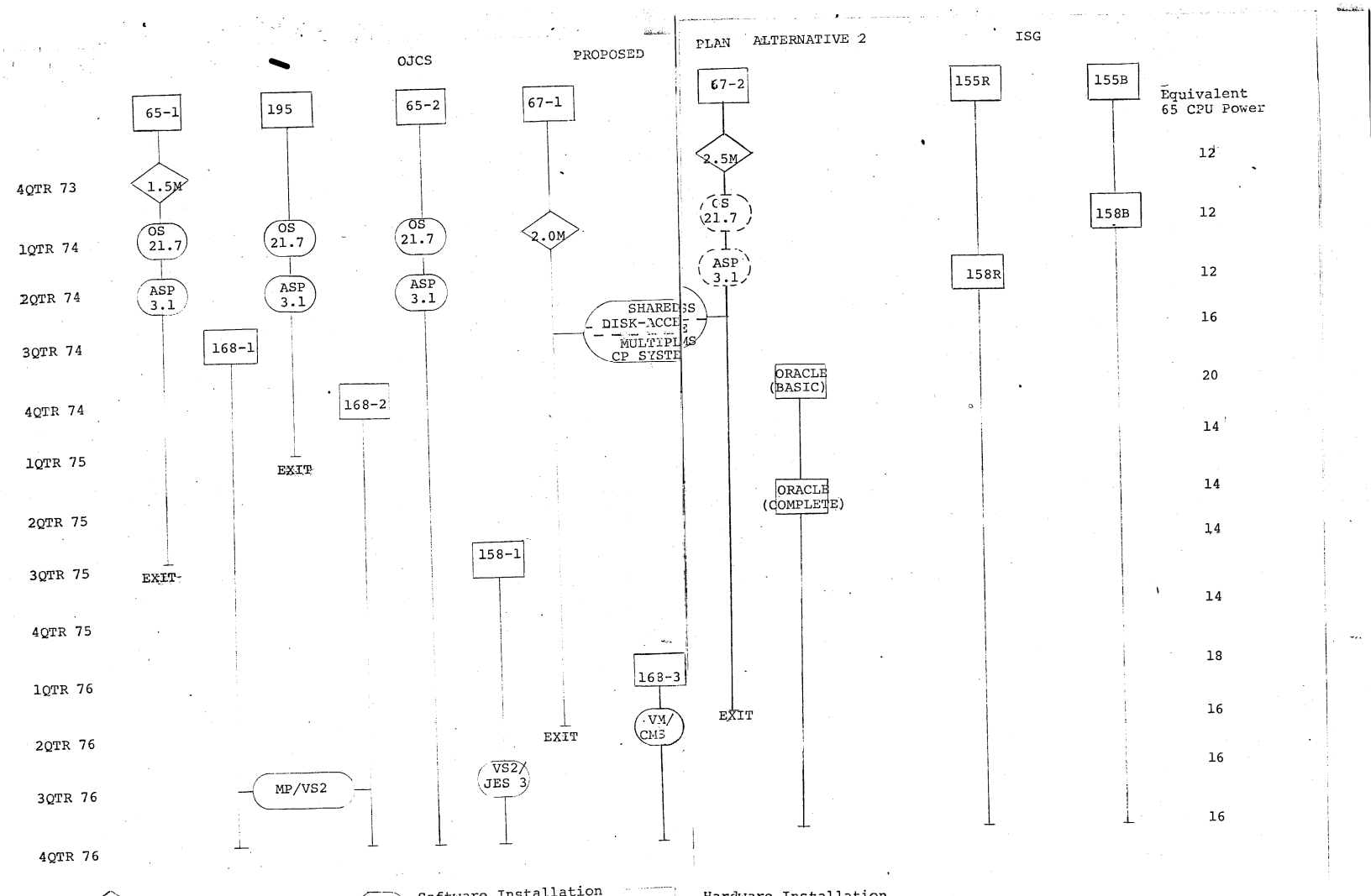
VI. MIGRATION PLANS











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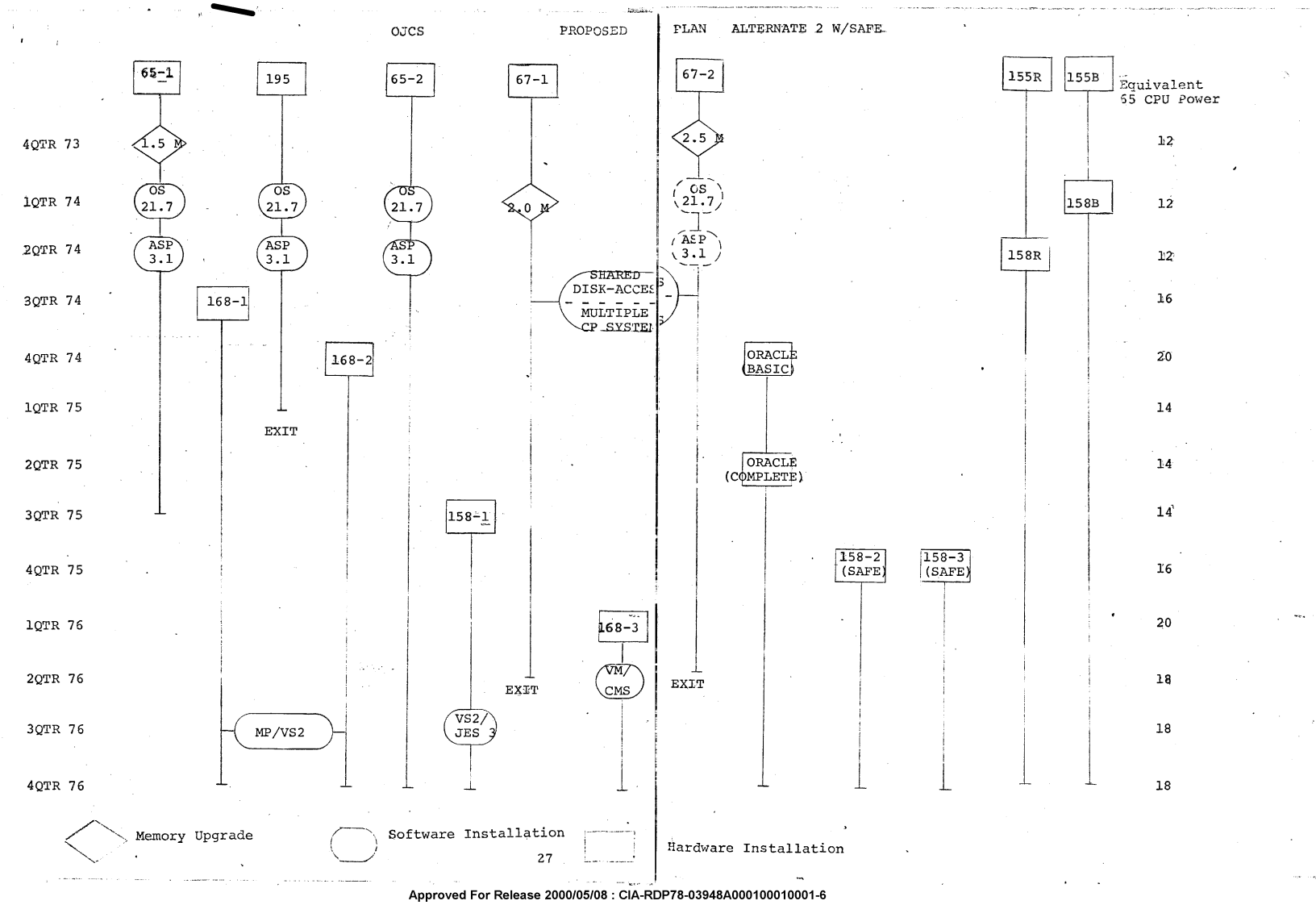

APPENDICES

APPENDIX A

PROPOSED APPLICATION CONFIGURATION FOR JANUARY 1974

65-1	1.5 Megabytes Memory	65-2	2.5 Megabytes Memory	195	2.0 Megabytes Memory
	GIMS II SANCA		ASP CRS 2250 BR-90 QT-2260 [redacted]		MAIN

25X1A

67-2	2.5 Megabytes Memory	67-1	1.0 Megabtyes Memory
	BACKUP GIMS I		CP/CMS

APPENDIX B

PROJECTED BATCH LOAD

Average Daily Totals

Jobs	July 73 ISD No.	July 73 ISD Hrs.	July 73 OJCS No.	July 73 OJCS Hrs.	July 73 Total No.	July 73 Total Hrs.	July 74 Total No.	July 74 Total Hrs.	July 75 Total No.	July 75 Total Hrs.	1976 Total No.	1976 Total Hrs.
0-14 min CPU	300	4	1316	26	1616	30	1966	37	2316	44	2666	51
Over 14 min CPU	14	12	62	51	76	63	92	76	108	89	124	102
Total	314	16	1378	77	1692	93	2058	113	2424	133	2790	153

APPENDIX C

PROJECTED INTERACTIVE LOAD

	July 73		July 74		July 75		July 76	
	Active	Total	Active	Total	Active	Total	Active	Total
ISD Users:								
STAR	30	40	44	52	48	56	60	80
DCS	9	9	9	9	9	9	9	9
ATS (Text Proc)	17	20	24	28	CP/CMS		CP/CMS	
NIPS	1	6	4	10	8	18	10	22
CRS Customers:								
SAFE/[redacted] 25X1A	12	16	20	30	40	60	60	120
OJCS Customers:								
SANCA	3	3	2	2	2	2	2	2
[redacted] 25X1A	2	2	2	2	2	2	2	2
GIM II	11	22	16	32	32	64	45	90
Graphics (2250)	1	1	2	2	2	3	3	4
Total OS	86	119	123	167	143	214	191	329
CP/CMS System Functions:								
Edit/Batch	40		50		60		70	
Text Processing	5		8		30		35	
Online Data Entry	0		10		15		20	
APL	5		20		30		40	
Program Development	10		12		20		25	
Interactive Programs	5		5		7		10	
Virtual Machines	2		3		4		5	
Total CP	67	100	108	200	166	300	205	400
Total	153	219	231	367	309	514	396	729

15 November 1973

APPENDIX D

CURRENT OJCS PLANS (FUNDED)

SYSTEM	MEMORY	SELECTOR	MULTIPLEXER	BLOCK MULTIPLEXER
65-1	1.5 MEG	3	1 MUX C1	1 BL MUX C2
65-2	2.5 MEG	3	1 MUX C1	1 BL MUX C2
67-1	1.0 MEG	3	1 MUX C1	1 BL MUX C2
67-2	1.5 MEG	3	1 MUX C1	1 BL MUX C2
195-1	2.0 MEG	5	1 MUX C1	1 BL MUX C2

PERIPHERALS			FY-74*	FY-75*
TAPE UNITS			41	41
DISKS (SPINDLES)				
IBM	2314	SD	8	8
	3330	SD	12	12
CAL	2314	SD	72	72
	2314	DD	36	36
CDC	3330	SD	40	40
DRUMS				
	2301		5	5
	2305		2	2
CONTROLLERS				
MEMOREX			4	4
COMTEN-3670			2	2

* As of end of FY

15 November 1973

	FY-74*	F&-75*
I/O		
PRINTERS - 1403	5	5
3211	3	3
MOHAWK	2	2
ODEC	1	1
HETRA	1	1
CARD READER/PUNCH	4	4
CARD READER	1	1
TERMINAL		
TYPEWRITER		
IBM 2741	95	95
TI KSR	102	202
TI RO	56	56
GE	2	4
DATEL	2	2
	257	359
CRT		
IBM 2260	0	0
DD 5260	194	217
RJE'S		
HETRA	8	8
SPECIAL		
UNIDENTIFIED 5K@	20	40

*As of end of FY

October 1973

SCHEDULE OF ADP FUNDS
(In Thousands)

		1974	1975
I.	ADP Rents (2358)		
	Systems: IBM 360/65-1	25X1A	[redacted]
	IBM 360/65-2		
	CDC 8092/915		
	IBM 360/67-1		
	IBM 360/67-2		
	COMTEN 3670		
	IBM 360/195		
	IBM 370/168		
	Peripherals		
	EAM		
	Subtotal		
II.	ADP Purchases (3109)		
	Systems: COMTEN 3670		
	Peripherals		
	EAM		
	Subtotal		

October 1973

PERIPHERAL RENTALS

	FY 1974	FY 1975
IBM Tape Units	[redacted]	
IBM Disk Storage		
IBM Drum Storage		
IBM Printers, Card Readers, Controls		
IBM Communication Terminals		
IBM Display Terminals & Controls		
IBM Graphics Terminal		
IBM Switches, Paper Tape		
CDC Disks		
CalComp Disks		
Memorex Controls		
Data 100 RJE		
Delta Data Terminals		
TI Terminals		
GE Terminet Terminals		

25X1A

Peripheral Purchases

	FY 74		FY 75	
	Quantity	Cost	Quantity	Cost
Visual Display Terminals	[redacted]			
Remote Input/Output Devices				
Disk Packs				
Mohawk HiSpeed Printers				
Typewriter Terminals				
Special Terminals				
PDP-11 Input/Output Devices				
Other Electronic and ADP Equipment				
Total				

25X1A

November 1973

PROJECTED RENTAL BUDGET FOR PROPOSED PLAN
(Thousand Dollars)

		Monthly Cost	FY-74	FY-75	FY-76
Guidance					
DDO 158s	25X1A				
TOTAL					
Office Estimate					
Presently Installed and on Order					
ADJUSTMENT TO PLAN					
67-2 add 1/2 meg	Dec 73				
67-2 add 3 drums	Jan 74				
67-1 add 1 meg	Apr 74				
168-1 installation	Sep 74				
168-2 installation	Nov 74				
195 release	Dec 74				
3670 COMTEN (3rd) add	Jan 75				
65-1 release	Jan 75				
158s absorb ISD	Mar 75				
158-1					
158-2					
168-3 installation	Aug 75				
158-1 release	Sep 75				
158-2 release	Sep 75				
65-2 release	Sep 75				
168-4 installation	Mar 76				
67-1 release	Jun 76				
67-2 release	Jun 76				
TOTAL RENTAL					

* Purchase cost.
** Includes 10% extra use.
*** Includes 24% extra use.

PROJECTED RENTAL BUDGET FOR PROPOSED PLAN WITH SAFE OPTION
(Thousand Dollars)

		Monthly Cost	FY-74	FY-75	FY-76
Guidance					
DD/O 158s					
TOTAL	25X1A				
Office Estimate					
Presently Installed and on Order					
ADJUSTMENT TO PLAN					
67-2 add 1/2 meg	Dec 73				
67-2 add 3 drums	Jan 74				
67-1 add 1 meg	Apr 74				
168-1 installation	Sep 74				
168-2 installation	Nov 74				
195 release	Dec 74				
3670 COMTEN (3rd) add	Jan 75				
65-1 release	Jan 75				
158s absorb ISD	Mar 75				
158-1					
158-2					
168-3 installation	Aug 75				
158-1 (SAFE)	Sep 75				
3670 COMTEN (4th)	Sep 75				
158-2 release	Sep 75				
65-2 release	Sep 75				
168-4 installation	Mar 76				
67-1 release	Jun 76				
67-2 release	Jun 76				
TOTAL RENTAL					

* Purchase cost.
** Includes 10% extra use.
*** Includes 24% extra use.

ALTERNATIVE 1
PROJECTED RENTAL BUDGET FOR PROPOSED PLAN
(Thousand Dollars)

		Monthly Cost	FY-74	FY-75	FY-76
Guidance					
DD/O 158s					
TOTAL					
	25X1A				
Office Estimate					
Presently Installed and on Order					
ADJUSTMENT TO PLAN					
67-2 add 1/2 meg	Dec 73				
67-2 add 3 drums	Jan 74				
67-1 add 1 meg	Apr 74				
168-1 installation	Sep 74				
168-2 installation	Nov 74				
195 release	Dec 74				
3670 COMTEN (3rd) add	Jan 75				
158s absorb ISD	Mar 75				
158-1					
158-2					
168-4 installation	Mar 76				
67-1 release	Jun 76				
67-2 release	Jun 76				
TOTAL RENTAL					

ALTERNATIVE 1 WITH SAFE OPTION
PROJECTED RENTAL BUDGET FOR PROPOSED PLAN
(Thousand Dollars)

		Monthly Cost	FY-74	FY-75	FY-76
Guidance					
DD/O 158s					
TOTAL	25X1A				
Office Estimate					
Presently Installed and on Order					
ADJUSTMENT TO PLAN					
67-2 add 1/2 meg	Dec 73				
67-2 add 3 drums	Jan 74				
67-1 add 1 meg	Apr 74				
168-1 installation	Sep 74				
168-2 installation	Nov 74				
195 release	Dec 74				
3670 COMTEN (3rd) add	Jan 75				
158s absorb ISD	Mar 75				
158-1					
158-2					
158 (SAFE) installation	Nov 75				
158 (SAFE) installation	Nov 75				
3670 COMTEN (SAFE) add	Nov 75				
168-4 installation	Mar 76				
67-1 release	Jun 76				
67-2 release	Jun 76				
TOTAL RENTAL					

* Purchase cost.
** Includes 10% extra use.
*** Includes 24% extra use.

ALTERNATIVE 2
PROJECTED RENTAL BUDGET FOR PROPOSED PLAN
(Thousand Dollars)

		Monthly Cost	FY-74	FY-75	FY-76
Guidance					
DD/O 158s					
TOTAL					
	25X1A				
Office Estimate					
Presently Installed and on Order					
ADJUSTMENT TO PLAN					
67-2 add 1/2 meg	Dec 73				
67-2 add 3 drums	Jan 74				
67-1 add 1 meg	Apr 74				
168-1 installation	Sep 74				
168-2 installation	Nov 74				
195 release	Dec 74				
3670 COMTEN (3rd) add	Jan 75				
158s absorb ISG	Mar 75				
158-1					
158-2					
158-3 installation	Aug 75				
65-1 release	Sep 75				
168-4 installation	Mar 76				
67-1 release	Jun 76				
67-2 release	Jun 76				
TOTAL RENTAL					

* Purchase cost.
** Includes 10% extra use.
*** Includes 24% extra use.

November 1973

ALTERNATIVE 2 WITH SAFE OPTION
PROJECTED RENTAL BUDGET FOR PROPOSED PLAN
(Thousand Dollars)

		Monthly Cost	FY-74	FY-75	FY-76
Guidance					
DD/O 158s					
TOTAL					
Office Estimate	25X1A				
Presently Installed and on Order					
ADJUSTMENT TO PLAN					
67-2 add 1/2 meg	Dec 73				
67-2 add 3 drums	Jan 74				
67-1 add 1 meg	Apr 74				
168-1 installation	Sep 74				
168-2 installation	Nov 74				
195 release	Dec 74				
3670 COMTEN (3rd) add	Jan 75				
158s absorb ISD	Mar 75				
158-1					
158-2					
158-3 installation	Aug 75				
65-1 release	Sep 75				
158 (SAFE) add	Nov 75				
158 (SAFE) add	Nov 75				
3670 COMTEN (SAFE) add	Nov 75				
168-4 installation	Mar 76				
67-1 release	Jun 76				
67-2 release	Jun 76				
TOTAL RENTAL					

[redacted]

* Purchase cost.
** Includes 10% extra use.
*** Includes 24% extra use.

Appendix E

Typical I/O Configuration and Comparative System Rental Costs

S/370/168 I/O Configuration	MAC	4 Meg S/370/168	2 Meg S/360/195	4 Meg S/360/195	4 Meg S/370/158
CPU with 2 MEGABYTES	59000				41100
Additional 2 MEGABYTES	10600			40000	11400
Misc	10250				
	79850	79850	154465	194465	52500
Channels (8)					
1 2870 MPX	2195				
1 2860-3 (3 channels)	3895				972 (5-channels)
2 2880 Blk. MPX. @4640 (4 channels)	9280				
	15370	15370	15370	15370	
System I/O Devices					
16 3330 Disk	11522				
1 2835 Drum Ctl.	2500				
1 2305 Drum	3900				
	17922	17922	17922	17922	17922
		113142	187757	227757	71394

PA 73-1
31 July 1973

TERMS OF REFERENCE FOR PLANNING GROUP OJCS COMPUTER SYSTEMS PLAN Calendar Years 1974 - 1976

A. Purpose.

A Planning Group is constituted to develop a plan for OJCS computer systems for the calendar years 1974 - 1976.

B. Scope.

The plan should address hardware, operating systems, languages, utilities, and special subsystems that comprise the total computer systems for which OJCS has operational responsibility.

C. Composition.

The Planning Group will be composed of the following members:

25X1A [redacted] Chairman

The Chief, Planning Staff and/or his staff assistant will participate in regular meetings.

D. End Product.

By 15 October 1973, the Planning Group will submit a draft of an OJCS Computer Systems Plan to the Management Committee for consideration. The plan should include assumptions, a description of major system components and workflow, milestones, costs, a discussion of alternatives, and the rationale for the recommended plan.

E. Procedure.

1. Members of the Planning Group must give continuing attention to their on-going responsibilities, but this planning activity should be their second most important task.

2. The Planning Group is encouraged to call on anyone in OJCS for information, ideas, or comments. The end product should be the result of the best efforts of the entire Office. Comments on any major unresolved issues or significant minority views should be included.

3. Substantive guidance in the form of computer system goals and constraints is attached. This should be considered a draft; review and comments on this guidance should be given early attention by the Planning Group.

4. When approved, the plan will be the basis for more specific system development and installation plans in the Systems Engineering and Operations Divisions. These more specific action plans will be the basis for budgeting and procurement. Changes to the overall plan will be made by Planning Memoranda which must be approved by the Management Committee.

5. The Planning Staff will provide administative support and coordination for the Planning Group as needed.

25X1A

[redacted]

for JOHN D. IAMS
Director of Joint Computer Support

Attachment: a/s

DRAFT GUIDANCE FOR PLANNING GROUP

OJCS COMPUTER SYSTEMS PLAN

GOALS

Management. The plan must provide an environment which enhances our standards, procedures, and audit methods that enable OJCS to regulate the use of its machine resources. The computer center, not the user, must manage our resources.

Productivity. The plan should provide the means to increase the productivity of the center by at least 25% through measurement, analysis, and tuning of both systems and applications programming.

Time Sharing.

a. Increase the personal interactive computing facilities of the center. Aim for a system giving good response time (2 seconds) to a user population primarily concerned with using canned applications programs and with program development of small applications. Provide at least one fully supported interactive language such as BASIC or Conversational FORTRAN. Provide an informative busy signal when a terminal connection cannot be made.

b. Transfer the services now provided by the CP system elsewhere except those which support users defined in a. above and those users engaged in systems development where a virtual machine environment is required. Purpose: to provide for the possibility over the long

range of distributed minicomputers and/or intelligent terminals to assume the capabilities needed by users defined in a. above.

c. Provide a flexible, economical graphics capability. This should include CRT and hard copy graphics at the user station.

Stability. Guarantee nearly 100% effective up time from 0700 to 2000 hours for interactive users. MAP applications are of particular concern. If necessary, do this at some expense to turnaround time for batch users. (See Turnaround Time.)

Change. Manage and limit change. The plan must include standards and procedures that minimize configuration changes and, where changes are necessary, space these out in an orderly manner.

Peripheral Storage. Bring mass storage into the center in an orderly and efficient manner. Allow for the gradual expansion of the system. Consider ORACLE to be an internal processing subsystem for the center, not a user-oriented capability.

Operations. Keep systems simple to operate. Provide operators with machine aids that increase their productivity and minimize procedural mistakes. They are the center's most valuable resource. Provide them with an environment that aims toward making them sophisticated managers of production line processes. Aim at reducing the number of people and the traffic of the computer center floor to a minimum.

Mixed Vendors. Keep a good mix of vendors, but keep the number of vendors down. A savings in hardware costs is insufficient reason to

change vendors or trade models, one-for-one.

Status Reporting. Include the means for keeping the user up to date on center performance, his access to it, and the status of his work. Provide this in visual form at strategic locations in Headquarters Building. If possible, make it available to terminals on user demand.

Turnaround Time. The objective is not to minimize batch turnaround time, but to hold it at a reasonable level -- within two hours, on the average -- while devoting more attention to other goals such as the stability and response of our interactive capability.

CONSTRAINTS

DD/O Computer Center. Current near term DD/O plans for the DD/O Center should not be disturbed. That center's functions will remain intact at least through March 1974. The Computer Systems Plan should address the question of enhancement of the DD/O center as a separate entity and/or evolutionary integration of the two centers only after that date.

Space. No increase, but DD/O space may be considered together with OJCS within the above constraints.

Utilities. Minimize additional load on air conditioning, power, or chilled water; coordination with OL planning is required.

Communications. Keep requirement for communication facilities within Commo's ability to satisfy them. Note that Commo (and OPPB) has accepted our requirement for a switching capability for the Headquarters Data Distribution System.

Growth. The following growth patterns are considered tolerable from a management viewpoint. They are not estimates of real need.

a. Batch. Growth at the rate of the recent past.

b. Interactive. Serve 100 independent users simultaneously on-line at end of first year and increase by 50 per year thereafter. Growth of other applications such as MAP/GIM at the rate of 50 simultaneously active terminals per year.

Peripheral Storage. Except for the known requirements of MAP, STAR, and SAFE, the overall amount of peripheral storage should stay constant or even decrease over the next two years. This should be possible through sound storage management procedures and the facilities of ORACLE.

Money. Two options for equipment rental budget figures should be considered:

a.

	FY 1973	FY 1974	FY 1975	FY 1976
25X1A	[redacted]			

b.

	FY 1973	FY 1974	FY 1975	FY 1976
25X1A	[redacted]			

People. There will be no increase in the OJCS strength of [redacted] 25X9 through FY 1975.

Technology. Restrict the plan to equipment and software in production, announced or expected to be announced before June 1974. Devices should have a useful installed life of at least two years.

APPENDIX C

GUIDANCE FOR OJCS COMPUTER SYSTEMS PLANNING GROUP

BASIC GOALS

Increased User ADP Productivity

Provide facilities and procedures which will aid OJCS users to be more productive through the use of OJCS computing resources.

Improved Management of ADP Computer Resources

Develop an environment which will enable OJCS to regulate and manage the use of its resources efficiently.

Improved Capabilities of ADP Systems

Provide facilities and procedures which will increase the productivity of the Center by 25% with no space, people or money budgetary increases.

GOAL PARTICULARS

A. Increased User ADP Productivity

1. Stability. Provide systems which will allow a minimum interruption to OJCS facilities used for critical applications such that users may rely on the availability of productive computer facilities.

2. Availability. Provide facilities such that OJCS can approach nearly 100% effective round-the-clock up time with minimal access restrictions.

3. Personal Computing. Increase the current interactive computing facilities so that more users may directly utilize the OJCS computing facilities without the need for and resulting delay of programmers and technician intervention.

4. Status Reporting. Improve the means for keeping the user up to date on the Center's performance, his access to it, and the status of his work.

B. Improved Management of ADP Resources

1. Change. Manage and limit change. The plan must include standards and procedures that minimize change and, where changes are necessary, control them in an orderly manner.

2. Turnaround Time. Balance the batch and online service priorities such that batch turnaround time is maintained at a reasonable level.

3. Operations. Automate and simplify system operations to increase their productivity and minimize procedural errors. Provide an environment that aims toward the development of sophisticated operation managers of production line processes. Aim at reducing the number of people needed in the Computer Center.

4. Mixed Vendors. Maintain a good mix of vendors where it does not conflict with the desired stability and availability.

5. Security. Plan for systems that provide adequate hardware and software security features.

6. Consolidation of Similar Services. Avoid the proliferation of redundant application subsystems.

7. Peripheral Storage. Install mass storage in an orderly and efficient manner; allow for gradual system expansion. Consider ORACLE to be an internal processing subsystem for the Center, not a user-oriented capability.

8. Standards. Plan systems that permit application of standards, procedures, and audit methods that will enable OJCS to regulate the use of its ADP resources.

C. Improve Capabilities of ADP Systems

1. Application Configuration. Reconfigure applications on systems, where necessary, to provide efficient service and best use of the facilities available.

2. Graphics. Provide accessible, flexible, and economic graphic capabilities.

3. Networking. Expand the interprocessor communications facilities to reduce the need for duplication of services.

4. Distributive Processing. Plan for greater application of intelligent input/output processors to user needs.